Arithmetic and Geometric Sequences

Reporting Category   Number and Number Sense

Topic   Describing arithmetic and geometric sequences

Primary SOL   7.2   The student will describe and represent arithmetic and geometric sequences, using variable expressions.

Related SOL   7.13a   write verbal expressions as algebraic expressions and sentences as equations, and vice versa

7.13b   evaluate algebraic expressions…

Materials
- Pictures or objects that have a repeated pattern
- Sequence Match activity sheet (attached)

Vocabulary

pattern, sequence (earlier grades)

geometric sequence, arithmetic sequence, common ratio, common difference (7.2)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Show the class some examples of objects or pictures that have a repeated pattern. Ask students to find the patterns.

2. Explain that patterns (sequences) can occur with a list of numbers. Introduce geometric and arithmetic sequences. Give students several examples and ask them to find the common difference or common ratio. Ask them to identify the next number in the sequence. Write a variable expression to describe the relationship between the consecutive terms of the sequence.

3. Distribute copies of the Sequence Match activity sheet, and have students complete it.

Assessment
- **Questions**
  - How can variable expressions be used when working with geometric and arithmetic sequences?
  - What is the difference between a geometric and arithmetic sequence?
- **Journal/Writing Prompts**
  - Create and describe a geometric sequence.
  - Create and describe an arithmetic sequence.
  - Create a sequence that is neither geometric nor arithmetic. Write a description of the sequence, and identify the common difference or common ratio.
- **Other**
  - Have students create their own sequences and ask a partner to write the variable expression describing the relationship between the consecutive terms of the sequence. Have students extend the patterns by the next three terms.

Extensions and Connections (for all students)
- Have students research the Fibonacci sequence.

Strategies for Differentiation
- Use counters or linking cubes to represent the numbers in the sequence. Students can add the appropriate number of counters to find the next number in a sequence.
- Show the common difference or common ratio under each term in the sequence.
- Revise the Sequence Match activity sheet to have the same number of items in each column.
- Create an arithmetic or geometric sequence sort.

Sequence Match

Name _____ **Date** _____

Match each sequence with the expression that describes the relationship between the consecutive terms of the sequence. Some choices will not be used.

_____ 1.   2, 4, 6, 8, 10 …

_____ 2.   1, 3, 9, 27, 81…

_____ 3.   45, 41, 37, 33, 29…

_____ 4.   11, 21, 31, 41, 51…

_____ 5.   10, 5, 2.5, 1.25, 0.625…

_____ 6.   11, 3, −5, −13, −21…

_____ 7.   100, 20, 4, 0.8, 0.16…

_____ 8.   7, 10.5, 15.75, 23.625, 35.4375…

a. $n + 10$
b. $0.3n$
c. $5n$
d. $n + 5$
e. $n + 2$
f. $0.5n$
g. $n + (-2)$
h. $n + (-4)$
i. $1.5n$
j. $3n$
k. $n + (-8)$
l. $2n$
m. $0.2n$

9.   Which of the above problems are arithmetic sequences? _____

10. Which of the above problems are geometric sequences?   _____

11. The _____ in an arithmetic sequence can be found by subtracting the first term from the second term.

12. The _____ in a geometric sequence can be found by dividing the second term by the first term.